

1        **FLEXIBLE WIRING AND TUBING CARRIER FOR SLIDE-OUT ROOMS**

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3                    Background of the Invention4        1.    Field of the Invention

5            The present invention comprises a wiring and tubing  
6        carrier for supporting line members such as wiring and/or  
7        tubing extending between a fixed structure and a movable  
8        structure, such as a slide-out room of a recreational  
9        vehicle.

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11       2.    Description of the Related Art

12           Recreational vehicles (RV's) often include a slide-out  
13        room which is movable between extended and retracted  
14        positions. The slide-out room remains retracted during  
15        transit of the vehicle and is extended when the vehicle is  
16        parked, to increase the usable floor space within the  
17        vehicle. Movement of the slide-out room is usually  
18        accomplished by an electric motor acting through a gear  
19        drive, chain drive, or the like.

20           If the slide-out room includes electrically operated  
21        outlets or equipment, a gas stove or heater, or plumbing  
22        fixtures, some means must be provided for the orderly

1 management of the wiring and/or tubing for such features  
2 during extension and retraction of the slide-out room. The  
3 wiring may include conductors for both low voltage (12V DC)  
4 and high voltage (110V AC). Plumbing may include water  
5 supply lines, as well as drain lines. Such lines must all  
6 be flexible. Additionally, such a wiring and tubing carrier  
7 must allow the wiring and/or tubing to flex as the slide-out  
8 room is extended and retracted, but must protect the lines  
9 from being pinched, stretched, or otherwise damaged.

10 In the past, wiring and tubing carriers for  
11 recreational vehicles have comprised a folding arm having  
12 two rigid sections of steel channel connected by a hinge  
13 joint. One end of the arm is hingedly connected to the main  
14 frame of the RV, and the opposite end of the arm is hingedly  
15 connected to the underside of the slide-out room so that the  
16 arm moves within a generally horizontal plane below the  
17 slide-out room. As the slide-out room is extended and  
18 retracted, the arm bends at the hinge joint. The channel is  
19 positioned with the flanges oriented inwardly toward the  
20 inside of the bend. The wiring and/or tubing is fastened to  
21 the arm sections, either inside the channel or on the back  
22 side of the channel, outside of the bend.

1           A problem with the folding arm type wiring and tubing  
2 carrier is that the hinge joint folds to a relatively sharp  
3 angle as the slide-out room is retracted, which can cause  
4 the wiring or tubing on the outside of the bend to be  
5 damaged by stretching. Wiring or tubing inside of the bend  
6 can be damaged by pinching. Gas lines are particularly  
7 susceptible to damage because they cannot be safely bent to  
8 less than a specific radius (such as 6 inches) depending on  
9 the hose configuration.

10          Wiring carriers having flexible support members are  
11 well known in applications other than slide-out rooms of  
12 recreational vehicles and trailers. For example, U. S.  
13 Patent No. 6,501,020 to Grant et al. and U. S. Patent No.  
14 3,551,612 to Guentner both disclose a flexible wiring  
15 carrier for routing at least one cable from a first portion  
16 of an electrical equipment support system to a second  
17 portion of the system, wherein the first portion is movable  
18 relative to the second portion. The wiring carriers each  
19 comprise a flexible support strip extending curvilinearly  
20 between the first and second portions of the electrical  
21 equipment support system, wherein the flexible support  
22 member moves in conjunction with the movement of the first  
23 portion of the system. In both cases, the flexible support

1 member remains connected between the first and second  
2 portions of the electrical equipment support system while  
3 the first portion moves.

4 The flexible support member of each patent has an upper  
5 edge extending continuously from the first portion of the  
6 equipment support system to the second portion. In both  
7 cases, substantially all of the upper edge remains disposed  
8 in a single horizontal plane while the flexible support  
9 member moves in conjunction with movement of the first  
10 portion. Both patents (6,501,020 and 3,551,612) teach that  
11 the wiring carrier has at least one retention feature or  
12 retainer fixedly disposed along the flexible support member  
13 for supporting at least one cable. Both patents teach the  
14 flexible support member as being a generally uniformly  
15 flexible strip or belt which is disposed generally beneath  
16 the first portion of the support system.

17 In each of the devices disclosed by the Grant and  
18 Guentner patents, a first end of the flexible support member  
19 is rigidly connected to the first portion of the support  
20 system such that a respective first leg of the flexible  
21 support member remains, or is constrained to remain,  
22 oriented generally parallel to the direction of movement of  
23 the first portion, throughout the range of movement of the

1 first portion. Similarly, a second end of the flexible  
2 support member is rigidly connected to the second portion of  
3 the support system, such that a respective second leg of the  
4 flexible support member remains, or is constrained to  
5 remain, oriented generally parallel to the direction of  
6 movement of the first portion throughout the range of  
7 movement of the first portion.

8 A problem that occurs with flexible support strips for  
9 wires and tubes, when both ends of the carrier strip are  
10 fixed in place, is that the strip may be stressed  
11 excessively unless the range of motion is limited for a  
12 given length of strip or the length of the strip must be  
13 increased for a given length of motion than might otherwise  
14 be necessary. Another problem with flexible strip type  
15 cable and tube supports is the volume of space which is  
16 occupied by the mechanism or which must be dedicated to  
17 clear the support strip and supported wires and tubes from  
18 the retracted position through the extended position.

#### 19 20 Summary of the Invention

21  
22 The present invention comprises a wiring and tubing  
23 carrier for a slide-out room of a trailer, recreational

1 vehicle, or the like. The carrier includes a flexible  
2 support member or carrier strip which extends arcuately  
3 between the main body of the vehicle and an outer skirt of  
4 the slide-out room. A first end of the carrier strip is  
5 pivotally connected to the main body of the vehicle, and an  
6 opposite second end of the carrier strip is fixedly  
7 connected to the outer skirt of the slide-out room, such  
8 that a leg of the carrier strip extending immediately from  
9 the fixed end of the strip is oriented generally  
10 perpendicularly to the direction of movement of the slide-  
11 out room. A plurality of retainer members or plates are  
12 spaced along the carrier strip and are adapted for  
13 supporting or securing a combination of line members, such  
14 as electrical wires or flexible fluid-carrying tubes, which  
15 are extended through holes in the retainer plates to retain  
16 the line members in close proximity to the carrier strip as  
17 the slide-out room is extended and retracted relative to the  
18 vehicle.

19 The carrier strip is an elongated flat strip of a  
20 flexible and resilient material. A pivot sleeve is attached  
21 at the pivoted or inner end of the carrier strip and is  
22 received over a pivot pin or spindle mounted on the bottom  
23 side of a floor member of the trailer vehicle. A collar is

1 secured to the pivot pin to enable the sleeve to pivot  
2 freely on the pivot pin. The fixed or outer end of the  
3 carrier strip is secured to a component of the slide-out  
4 room, such to an outer skirt, as by the use of a mounting  
5 plate and threaded fasteners, such as screws or bolts.

6 The ends of the carrier strip are mounted in a  
7 generally aligned relation, and remain in such alignment  
8 during translation of the slide-out room. The carrier strip  
9 extends arcuately or in a curved shape between the pivoted  
10 end and the fixed end. Movement of the slide-out room to  
11 the extended position draws the carrier strip out to an  
12 extended configuration in which the carrier strip, although  
13 still arcuate, has curves of larger radii. It is foreseen  
14 however, that the carrier strip could be pulled relatively  
15 taught and straight when the room is advanced to the  
16 extended position. As the room is retracted, the pivotal  
17 connection of the inner end to the trailer floor, the fixed  
18 connection of the outer end to the slide-out room, and the  
19 resilience of the carrier strip cooperate to allow the  
20 carrier strip to assume a somewhat spiral shape relative to  
21 the pivot pin, thus minimizing the space occupied by the  
22 carrier mechanism.

1       Line members such, such as electrical cables and  
2   flexible fluid carrying tubes, are retained along the  
3   carrier strip by a plurality of retainer plates spaced along  
4   the carrier strip. Each retainer plate is a flat  
5   rectangular member with a slot formed therethrough and a  
6   plurality of apertures for the wires and/or tubes sized to  
7   enable such wires or tubes to pass loosely therethrough.  
8   The slot or slit is sized to receive the carrier strip to  
9   enable the retainer plates to be spaced along the carrier  
10  strip. The retainer plates may be held in place along the  
11  carrier strip by forming small crimps in the edges of the  
12  carrier strip on opposite sides of each retainer plate, once  
13  the plate is placed in a desired position along the carrier  
14  strip.

15       The carrier strip can be formed from a wide variety of  
16  flexible and generally resilient material such as galvanized  
17  steel, spring steel or a fiber reinforced polymer. The  
18  retainer plates are formed separately of a material such as  
19  a hard rubber, a polymer, or the like. It is also foreseen  
20  that the line retainer members or features could be formed  
21  integrally with the carrier strip. The line retainer  
22  features could be provided as holes or apertures formed  
23  through the strip or as members stamped out of the strip. A



1 carrier strip formed from a polymer or composite could be  
2 formed by a molding process and could include integrally  
3 molded line retainers.

4 The various features of the flexible line carrier  
5 apparatus of the present invention provides a mechanism for  
6 handling wires and flexible tubes extending between  
7 relatively movable structures, such as a trailer or  
8 recreational vehicle and a slide-out room, which is compact  
9 in both retracted and extended configurations and which, in  
10 some cases, minimizes flexure of such wires or tubes. The  
11 carrier mechanism of the present invention is also  
12 relatively simple in construction and installation.

13 Various additional objects and advantages of this  
14 invention will become apparent from the following  
15 description taken in relation to the accompanying drawings  
16 wherein are set forth, by way of illustration and example,  
17 certain embodiments of this invention.

18 The drawings constitute a part of this specification,  
19 include exemplary embodiments of the present invention, and  
20 illustrate various objects and features thereof.

1                   Brief Description of the Drawings

2  
3           Fig. 1 is a perspective view of a trailer structure  
4 within which is installed a flexible wiring and tubing  
5 carrier mechanism for slide-out rooms which embodies the  
6 present invention, with an extended position of a slide-out  
7 room shown in phantom lines.

8           Fig. 2 is an enlarged fragmentary view of the flexible  
9 wiring and tubing carrier mechanism with wiring and tubing  
10 members connected thereto, shown in an inverted orientation  
11 for clarity.

12           Fig. 3 is a fragmentary bottom plan view of the  
13 flexible wiring and tubing carrier mechanism at a reduced  
14 scale, with the carrier mechanism and the slide-out room  
15 shown in retracted configurations.

16           Fig. 4 is a view similar to Fig. 3 with the carrier  
17 mechanism and the slide-out room shown in a partially  
18 extended configuration.

19           Fig. 5 is an enlarged cross sectional view taken on  
20 line 5-5 of Fig. 3 and illustrates details of a retainer  
21 plate of the carrier mechanism.

1        Fig. 6 is an enlarged fragmentary bottom plan view  
2 taken on line 6-6 of Fig. 5 and illustrates further details  
3 of a retainer plate of the carrier mechanism.

4        Fig. 7 is an enlarged fragmentary side elevational view  
5 showing details of a carrier strip and pivot pin of the  
6 carrier mechanism, shown in an inverted orientation.

7        Fig. 8 is an enlarged fragmentary bottom plan view  
8 showing further details of the carrier strip and pivot pin  
9 of the flexible wiring and tubing carrier mechanism of the  
10 present invention.

11       Fig. 9 is a front-perspective view of an alternative  
12 embodiment of a carrier mechanism of the present invention.

13       Fig. 10 is a rear perspective view of the alternative  
14 embodiment shown in Fig. 9.

15       Fig. 11 is an enlarged and fragmentary perspective view  
16 showing a wire threaded through a hole in a retainer of the  
17 alternative embodiment of the carrier mechanism as shown in  
18 Fig. 9.

19       Fig. 12 is a fragmentary bottom plan view of the  
20 flexible wiring and tubing carrier mechanism similar to that  
21 shown in Fig. 3 but pivotal at both ends and shown in a  
22 fully extended configuration.

1           Detailed Description of the Invention

2  
3           As required, detailed embodiments of the present  
4 invention are disclosed herein; however, it is to be  
5 understood that the disclosed embodiments are merely  
6 exemplary of the invention, which may be embodied in various  
7 forms. Therefore, specific structural and functional  
8 details disclosed herein are not to be interpreted as  
9 limiting, but merely as a basis for the claims and as a  
10 representative basis for teaching one skilled in the art to  
11 variously employ the present invention in virtually any  
12 appropriately detailed structure.

13           Referring to the drawings in more detail, the reference  
14 numeral 1 generally designates a flexible wiring and tubing  
15 carrier assembly or mechanism which embodies the present  
16 invention. The carrier mechanism 1 includes a flexible and  
17 resilient support member or carrier strip 3 with a plurality  
18 of retainer members 5 positioned in spaced relation along  
19 the carrier strip 3. The retainer members 5 are used to  
20 attach a plurality of line members 7, such as electrical  
21 cables or flexible fluid carrying tubes, to the carrier  
22 strip 3 and thereby manage such line members 7 which extend  
23 between a relatively movable structure 9, such as a slide-

1 out room, and a relatively stationary structure 11, such as  
2 a trailer, recreational vehicle (RV) or the like. Referring  
3 to Figure 1, the slide-out room 9 may be advanced from a  
4 retracted position to an extended position (as shown in  
5 phantom lines) relative to the trailer 11 to increase the  
6 enclosed space of the trailer 11 that may be utilized. The  
7 slide-out room 9 may then be advanced back to the retracted  
8 position to facilitate transportation. The slide-out room 9  
9 slides or moves relative to the trailer or vehicle 11 and  
10 therefore the slide-out room 9 may be referred to as the  
11 relatively movable structure and the vehicle or trailer 11  
12 may be referred to as the relatively stationary structure.

13 The room 9 may have electrical wiring, gas lines and/or  
14 plumbing which communicate with systems or utility sources  
15 within the vehicle 11. The line members 7 provide for the  
16 supply of utilities from the vehicle 11 to the room 9, as  
17 managed by the carrier mechanism 1. The line members 7 may  
18 include high voltage wiring 15 (Fig. 5) such as AC power  
19 cabling or Romex (General Cable Technologies Corp.); low  
20 voltage cabling 17 such as telephone cabling, computer  
21 network cabling, video cabling, or the like; and various  
22 kinds of flexible fluid carrying conduits 19 such as for  
23 water, natural gas, propane fuel, or the like. The low

1 voltage cabling 17 is shown enclosed in a flexible  
2 protective sheath or conduit 21. It is to be understood  
3 that any of the line members 7 could also be enclosed in a  
4 flexible protective sheath such as sheath 21.

5 Referring to Figures 3 and 4, the illustrated vehicle  
6 11 includes vehicle framing 24 and a stationary floor 25 to  
7 which is connected a guide mechanism 27 for the slide-out  
8 room 9. The slide-out room 9 includes a floor 30 and a  
9 lower skirt 31 which extends below the floor 30. Rams or  
10 drive arms 32 (one of which is shown) are reciprocally  
11 mounted to the vehicle framing 24 such as by guide mechanism  
12 27. Outer ends of the drive arms 32 are connected to the  
13 lower skirt 31 of the slide-out room 9. The drive arms  
14 32, acting on the lower skirt 31, drive the slide-out room 9  
15 between the retracted configuration (Fig. 3) and extended  
16 configuration (Fig. 4) by operation of a drive mechanism  
17 (not shown). The structure of the slide-out room 9 and  
18 vehicle 11 are generally shown diagrammatically.

19 Although a slide-out room structure 9 of a trailer-type  
20 vehicle 11 is described and illustrated herein, the present  
21 invention is not intended to be strictly limited to use in  
22 such an environment. It is foreseen that the flexible  
23 carrier mechanism 1 would be beneficially applicable to

1 other types of relatively movable structures requiring the  
2 management of wiring or tubing therebetween.

3 Referring again to Figures 3 and 4, the carrier strip 3  
4 has an inner end 35 pivotally connected to the stationary  
5 structure 11, and an opposite outer end 37 is fixedly  
6 secured to movable structure 9. More specifically, and as  
7 shown in Fig. 3, a pivot pin 41 is mounted on the stationary  
8 floor 25 of the trailer 11 by way of a mounting plate 42  
9 (Figs. 7 and 8). It should be noted that, for clarity,  
10 Figs. 3 and 7 illustrate the carrier mechanism 1, the  
11 stationary structure 11, and the movable structure 9 in an  
12 upside down or inverted orientation. Thus, the pivot pin 41  
13 would normally be mounted on a lower surface of the  
14 stationary floor 25 and extend downwardly from the mounting  
15 plate 42.

16 The inner end 35 of the carrier strip 3 has a pivot  
17 sleeve 45 mounted thereon. The illustrated sleeve 45 is  
18 captured by the inner end 35 of the strip 3 being wrapped  
19 tightly around the sleeve 45 and attached, as by spot  
20 welding, to the remainder of the strip 3. The sleeve 45 is  
21 slid over the pin 41 and retained thereon by means such as a  
22 retainer collar 46 with a set screw. The sleeve 45 is sized  
23 to pivot freely on the pin 41. The outer end 37 of the

1 carrier strip 3 is provided with apertures 48 (Fig. 7) to  
2 receive fasteners to thereby enable securing the outer end  
3 37 to the lower skirt 31 of the slide-out room 9. A  
4 rectangular mounting plate 49 may be used to reinforce the  
5 carrier strip end 37.

6 The illustrated carrier strip 3 is a thin, relatively  
7 wide, elongated strip or web and is formed of a material  
8 which is both flexible and resilient, that is, which has a  
9 shape retaining property. Such a material could include a  
10 galvanized steel strip, spring steel or a plastic material  
11 such as a fiber reinforced plastic. Another such material  
12 foreseen for the support strip 3 is a product manufactured  
13 by Kencove Farm Fence, Inc. and sold as horse fencing. The  
14 material is formed by two strands of high tensile strength  
15 12½ gauge steel wire molded into a 4 to 4.25 inch wide  
16 plastic web, near the outer edges thereof. A desired  
17 property of the strip 3 is that it be resistant to sag  
18 within its own plane, while being easily flexible in a  
19 direction normal to its plane. In other words, the strip 3  
20 holds the line members 7 at a generally constant level or  
21 grade beneath the floor 25 to prevent the line members 7  
22 from sagging when the slide-out room 9 is retracted.



1        Referring particularly to Figs. 5 and 6, the  
2        illustrated line retainers 5 are rectangular retainer  
3        plates, each having a slot or slit 52 and a plurality of  
4        line member receiving apertures 54 formed therethrough. The  
5        slot 52 is sized to enable the carrier strip 3 to pass  
6        therethrough whereby the retainers 5 may be positioned at  
7        selected intervals along the strip 3. The retainers 5 may  
8        be secured in desired places along the strip 3, as by crimps  
9        56 (Fig. 6) formed in the edges of the strip on opposite  
10       sides of each plate. It is foreseen that the crimps 56  
11       could be formed before or after the retainers 5 are threaded  
12       onto the carrier strip 3. The line receiving apertures 54  
13       are aligned and positioned a desired distance from the slot  
14       52. The apertures 54 are also spaced from one another a  
15       desired distance to separate and isolate the various line  
16       members 7 from one another. The spacing is selected to meet  
17       the requirements of adopted codes or regulations dictating  
18       the minimum spacing between adjacent electrical wires, which  
19       for example may have to be spaced an inch or more apart on  
20       centers.

21       The carrier mechanism 1 is installed before connecting  
22       the line members 7 to the fixtures or appliances in the  
23       slide-out room 9 with which they are to be associated. As

1 an initial step a desired number of retainers (five of which  
2 are shown in Figures 3 and 4) are threaded onto the carrier  
3 strip 3. Th retainers 5 are threaded onto the carrier strip  
4 3, so that the line receiving apertures 54 extend inward  
5 from the surface of the carrier strip 3 which will form the  
6 inner curved surface of the mechanism when installed. In  
7 addition, as a preliminary step, the pivot pin 41 is mounted  
8 in a desired location to the underside of the stationary  
9 floor 25 of the vehicle 11 by driving screws through the  
10 preformed holes in the mounting plate 42. Line members 7  
11 are then threaded through aligned line receiving apertures  
12 54 in the retainers 5.

13 The pivot sleeve 45 retained in the inner end 35 of the  
14 carrier strip 3 is slid onto the pivot pin 41 and secured in  
15 place with the retaining collar 46. The outer end 37 of the  
16 carrier strip 3 is then fastened to the lower skirt 31 of  
17 the slide-out room 9 using screws or other suitable  
18 fasteners driven through the apertures 48 formed therein.  
19 Although the outer end 37 of the carrier strip 3 is shown as  
20 positioned on the skirt 31 in axial alignment with the inner  
21 end 35 of the carrier strip (relative to the direction of  
22 travel of the room 9 relative to the vehicle 11), the outer  
23 end 37 can be offset relative to the first end either

1 horizontally or vertically. For example, referring to  
2 Figures 3 and 4, it may be preferable to mount the outer end  
3 37 of the strip 3 on the skirt, offset to the left more than  
4 is shown, such that the portion of the strip 3 extending  
5 just to the right of the mounting plate 49 is aligned with  
6 the pivot pin 41. This alignment maximizes the length of  
7 extension of the slide-out room 9 per a given length of  
8 strip 3. It is also foreseen that when the carrier  
9 mechanism 1 is used to support drain line, the outer end 37  
10 can be mounted slightly higher than the inner end 35,  
11 relative to the ground, to allow fluids in the drain line to  
12 drain properly.

13 The ends of the line members 7 extending past the outer  
14 end 37 of the carrier strip 3 are directed into the slide-  
15 out room 9 through one or more openings (not shown)  
16 extending through the floor 30.

17 An alternative embodiment 101 of the carrier mechanism  
18 1 is shown in Figures 9-11. The carrier mechanism 101  
19 includes a carrier strip 103, retainers 105 and hinge  
20 members or gussets 110 which are integrally formed as a  
21 single molded part which may be formed from a plastic with a  
22 flexible filler such as fiberglass reinforced polypropylene.  
23 The hinge members 110 and retainers 105 are formed on a

1 first or inner surface 113 of the carrier strip 103 and  
2 reinforcing flanges 114 are formed along the upper and lower  
3 edges of the carrier strip 103 and extend outward from a  
4 second or outer surface 115 of the carrier strip 103. A  
5 third or central reinforcing flange 116 is formed on the  
6 outer surface 115 centrally between the upper and lower  
7 reinforcing flanges 114.

8 The hinge members or gussets 110 are formed on an inner  
9 end 135 of the carrier strip 103 on the inner surface 113  
10 and include aligned apertures 136 extending therethrough to  
11 receive a pivot pin 41 for mounting of the carrier strip 103  
12 on the pivot pin 41. The embodiment shown includes four  
13 gussets 110, one each along the top and bottom edge of strip  
14 103 and two middle gussets 110 positioned in relatively  
15 closely spaced apart relation from each other generally  
16 medially between the upper and lower edges of strip 103.  
17 The middle gussets 110 are positioned in alignment with the  
18 middle reinforcing flange 116 on the opposite surface  
19 thereof.

20 The retainers 105 each include a plurality (three  
21 shown) of aligned line receiving apertures 154 formed  
22 therein and through which line members 7 may be threaded  
23 (two of which are shown in Fig. 11). A plurality of line

1 member engaging fingers 158 extend across the line receiving  
2 apertures 154. The fingers 158 are formed from a layer of  
3 the material forming the retainer 105 but of reduced  
4 thickness and with radially extending score lines formed  
5 therein to form the edges of the fingers 158. The fingers  
6 158 engage the outer surface of the line member 7 inserted  
7 through the associated line receiving aperture 154.

8       The carrier mechanism 101 is adapted to be cut in half,  
9 to provide a carrier adapted to support fewer line members  
10 7. To do so, the strip 103 is cut down the middle of the  
11 central reinforcing flange 116. The space between the  
12 middle gussets allows a cutting blade to pass between the  
13 two. The resulting half-strips formed from carrier  
14 mechanism 101, each include upper and lower reinforcing  
15 flanges, two gussets 110 and retainers having a single,  
16 whole, line receiving aperture 154 for supporting a single  
17 line member 7.

18       As suggested above, the retainers 105 could include  
19 more than three line receiving apertures 154, and in the  
20 case of a carrier mechanism with four line receiving  
21 apertures 154, the resulting half-strips might each include  
22 two line receiving apertures 154. It is also foreseen, that  
23 the middle reinforcing flange 116 and the middle gussets 110

1 could be positioned in alignment between one of the outer  
2 aligned sets of apertures 154 and the central aligned sets  
3 of apertures 154, so that when split, one of the resulting  
4 strips includes one aperture 154, per retainer, and the  
5 other strip includes two apertures 154 per retainer. It is  
6 also foreseen that a reinforcing flange, like the middle  
7 reinforcing flange 116, and closely spaced gussets 110 could  
8 be positioned between each of the adjacent line receiving  
9 apertures 154 on each retainer 105 to provide a carrier  
10 mechanism 101 that could be split into separate strips for  
11 each set of aligned line receiving apertures 154 (i.e. three  
12 strips for retainers originally having three apertures 154).  
13 Other variations and combinations of apertures 154, flanges  
14 116 and gussets 110 on each carrier mechanism 101 could be  
15 utilized as well.

16 It is to be understood that the carrier strips 3 or 103  
17 are only supported at their ends and are not supported  
18 therebetween. In a preferred embodiment, the material  
19 forming the carrier strip 3 or 103, is selected to have  
20 sufficient vertical stiffness (resistance to sagging) to  
21 support not only the weight of the line members 7 supported  
22 thereby, but also dirt, water and particularly ice which may  
23 accumulate on the carrier during certain travel conditions.

1           In addition to supporting the line members 7, the  
2 carrier strips 3 and 103 function to protect the line  
3 members 7 from wear on the skirt 31 or any frame members,  
4 such as frame member 24 against which the strips 3 and 103  
5 may abut when the slide-out room 9 is fully retracted.  
6 Since the line members 7 are supported on the inner curved  
7 surface of the carrier strips 3 or 103, as shown in Figure 3  
8 for strip 3, the outer surface of the strips provide a  
9 buffer or barrier to surfaces against which the line members  
10 7 might otherwise contact.

11           It is to be understood that while certain forms of the  
12 present invention have been illustrated and described  
13 herein, it is not to be limited to the specific forms or  
14 arrangement of parts described and shown. For example,  
15 although the carrier strip 3 is shown as being pivotally  
16 connected at only one end, it is foreseeable, the either or  
17 both ends of the carrier strip 3 could be pivotally mounted  
18 as is generally shown in Figure 12. As shown in Figure 12,  
19 both the inner end 35 and the outer end 37 of the carrier  
20 strip 3 are pivotally mounted on pivot pins 41 and 181  
21 respectively. Pivot pin 41 is mounted to the stationary  
22 structure or trailer 11 and the pivot pin 181 is mounted to  
23 the movable structure or slide-out room 9. A cutout or

1 notch 183 may be formed in the stationary floor 25 of the  
2 trailer 11 to receive the pivot pin 181 when the slide-out  
3 room 9 is fully retracted.

4 As shown in Figure 12, the inner end 35 of the carrier  
5 strip 3 can be connected to other structure associated with  
6 the slide-out room 9, other than the skirt 31. As another  
7 example, the inner end 35 could be connected to an L-shaped  
8 plate having a vertical leg abutting against the skirt and a  
9 horizontal leg bolted to the floor of the slide-out room 9.

10 The horizontal leg could be mounted to a bar extending  
11 between parallel extending rams used to slide the room 9  
12 between the extended and retracted positions, or the inner  
13 end 35 could be pivotally mounted on a pivot pin attached to  
14 and extending below such a bar. It is foreseen that other  
15 variations within the scope of the claims could be  
16 incorporated into such a line member carrier.